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Citation: Mikkonen, Kristina, Tomietto, Marco, Cicolini, Giancarlo, Kaucic, Boris Miha, Filej, Bojana, Riklikiene, Olga, Juskauskienė, Erika, Vizcaya-Moreno, Flores, Pérez-Cañaveras, Rosa M., De Raeve, Paul and Kääriäinen, Maria (2020) Development and testing of an evidence-based model of mentoring nursing students in clinical practice. *Nurse Education Today*, 85. p. 104272. ISSN 0260-6917

Published by: Churchill Livingstone

URL: <https://doi.org/10.1016/j.nedt.2019.104272>
<<https://doi.org/10.1016/j.nedt.2019.104272>>

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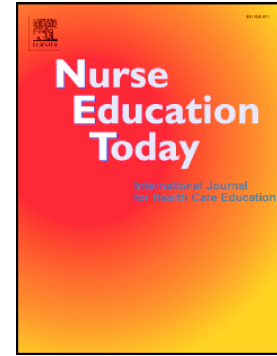


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An evidence-based model of mentoring in nursing

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PII: S0260-6917(19)30998-0

DOI: <https://doi.org/10.1016/j.nedt.2019.104272>

Reference: YNEDT 104272

To appear in: *Nurse Education Today*

Received date: 30 June 2019

Revised date: 15 September 2019

Accepted date: 15 November 2019

Please cite this article as: K. Mikkonen, M. Tomietto, G. Cicolini, et al., An evidence-based model of mentoring in nursing, *Nurse Education Today*(2019), <https://doi.org/10.1016/j.nedt.2019.104272>

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Article type: Original Research – Empirical Research – Quantitative

- **Short informative title**

DEVELOPMENT AND TESTING OF AN EVIDENCE-BASED MODEL OF MENTORING NURSING STUDENTS IN CLINICAL PRACTICE

- **Short running title**

AN EVIDENCE-BASED MODEL OF MENTORING IN NURSING

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Criteria	Author Initials
Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data;	KM, MT, GC, MK, BF, OR, EJ, FVM, RPC, PDR, MK
Involved in drafting the manuscript or revising it critically for important intellectual content;	KM, MT, GC, MK, BF, OR, EJ, FVM, RPC, PDR, MK
Given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content;	KM, MT, GC, MK, BF, OR, EJ, FVM, RPC, PDR, MK
Agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.	KM, MT, GC, MK, BF, OR, EJ, FVM, RPC, PDR, MK

- Acknowledgments:**

We would like to thank all project partners and BA students in Lithuania who have supported us in data collection process. We would like to acknowledge Sees-Editing Ltd (<http://www.seesediting.co.uk>) service for improving the language and helping us to communicate our findings to readers of the journal.

- Conflict of interests:**

The authors have no conflict of interests to declare.

- Funding:**

We would like to acknowledge European Commission, Erasmus+, KA2: Strategic partnership for providing funding for the project Quality mentorship for developing competent nursing students (QualMent).

Abstract

Background: Mentoring in clinical settings is an important factor in the development of nursing students' professional knowledge and competences, but more knowledge of mentors' current and required competences is needed to improve nursing students' clinical learning.

Objectives: This study aimed to develop and test an evidence-based model of mentoring nursing students in clinical practice.

Design: An international cross-sectional survey coordinated in five European countries: Finland, Italy, Lithuania, Slovenia and Spain.

Methods: Mentors, 4980 registered nurses working in both primary and specialist healthcare organizations, were invited to participate in the study during 2016-2019. The final sample consisted of 1360 mentors (mean age 41.9 ± 11). Data were collected with background questions and the Mentor Competence Instrument. The instrument was psychometrically validated then the data were used to construct a Structural Equation Model (SEM) with Full Imputation Maximum Likelihood (FIML) estimation.

Results: All of six hypotheses were verified. In summary: mentors' characteristics related to their motivation and reflection are positively related to mentoring practices in the workplace, which (together with constructive feedback) are positively related to and foster goal-orientation in students' clinical learning and student-centered evaluation. All parameters in the SEM model were significant and the model's fit indexes were verified (RMSEA=0.055; SRMR=0.083; CFI=0.914, TLI=0.909).

Conclusion: Our evidence-based modeling confirms the research hypotheses about mentorship, and identifies focal competences for designing mentors' education to improve students' clinical learning and establish a common European mentoring model. Mentorship is important for both healthcare organizations and educational systems to enhance students' clinical competences, professional growth and commitment to the nursing profession and organizational environments.

Keywords. Mentoring, competence, evidence-based model, nursing education, clinical placement, clinical learning.

Highlights

- Key competences nursing mentors require were identified;
- Mentors' characteristics including empathy, patience and motivation foster effective mentoring in the workplace and pedagogical competence;
- Effective goal-orientation promotes student-centered evaluation;
- Educational interventions to enhance mentors' competences should be designed and tested in diverse European educational and organizational settings;
- Our evidence-based model, and results, may facilitate development of a common mentoring model in Europe.

Introduction

To become a registered nurse in the European Union (EU), a candidate must complete a nursing program conducted according to European Directive 2013/55/EU, and in particular Article 31 (European Council, 2013). The Directive defines eight competences that future professional nurses must acquire, through higher degree-level theoretical and practical education. A key element in the development of their professional awareness and competences is learning in clinical practice (Allen, 2018), in which they are guided, taught and assessed by clinical registered nurses. Thus, these mentors make important contributions to nursing students' learning processes and outcomes in clinical practice (Loofmark et al., 2012; Jokelainen et al., 2013a; Ford et al., 2016; Perry et al., 2018). However, mentors' competences are patchy and required qualifications or training are poorly defined across organizational and educational settings in Europe (Dobrowolska et al., 2016). Thus, robust assessment of nurses' current and required competences as student mentors is crucial for development of high quality mentorship training and delivery for enhancing nursing students' learning in clinical practice (Oikarainen et al., 2018; Tuomikoski et al., 2018b).

Background

Nursing is essentially a practice-based profession, and students are best placed to develop nursing competences during clinical practice in authentic patient care, so according to European Directive 2013/55/EU, at least 50% of nursing students' professional education in the EU should be in a real clinical learning environment (CLE) (European Council, 2013). A CLE has been defined as “an interactive network or set of characteristics inherent to the practices that influence learning outcomes and professional development” as a nurse (Saarikoski and Strandell-Laine, 2018). Thus, clinical placements offer students optimal settings to observe professional models and reflect on what is seen or heard, perceived or made in real practice, learn and develop practical competences, and foster their professional socialization (Flott and Linden, 2016; Saarikoski and Strandell-Laine, 2018).

According to previous literature, the CLE concept encompasses four attributes that influence student learning experiences: the physical space, psychosocial interactions, the organizational culture, and teaching-learning process (Saarikoski and Strandell-Laine, 2018; Flott and Linden, 2016). In these respects, it forms a “clinical classroom”, with a complex social climate in which

students, nurses, teachers and patients interact. During the clinical learning process, the mentoring model and characteristics of the CLE are major determinants of degrees of nursing students' anxiety and feelings of vulnerability (Vizcaya et al., 2018).

Nordquist et al. (2019) have highlighted challenges raised by several authors, including: overcrowded clinical environments, understaffing, service pressures and high clinical workloads, stressful organizational and/or working conditions, lack of learning time with seniors, cognitive overload, limited time to reflect and discuss, and constraints on physical space. Students' clinical practice often needs to be guided and supported by nurse teachers of higher education institutions and clinical mentors (MacIntosh, 2015). In addition, students' clinical practice often needs to be guided and supported by nurse teachers of higher education institutions and clinical mentors (MacIntosh, 2015), but Warne et al. (2010) found that nurse teachers' participation in nursing students' clinical practice has declined in European organizations. Moreover, nurse teachers frequently experience job-related strain and inconsistent expectations regarding mentoring of nursing students in clinical practice (McSharry et al., 2010; Williams and Taylor, 2008). Support of nurse teachers is reportedly particularly important for licensed practical nursing students, relative to students training to be registered nurses (Pitkänen et al., 2018), and non-native nursing students (Mikkonen et al., 2016) in clinical practice.

Nurses in clinical practice also play important roles in facilitating development of nursing students' clinical skills and experience, and provision of support (Hilli et al., 2014a). There is empirical evidence that support from mentors in clinical practice is essential for nursing students' professional development, and positive mentor experiences enhance students' motivation to remain in the nursing profession (McIntosh et al. 2014). Thus, there is a clear need for competent mentors for mentoring nursing students in clinical practice. This competence is understood as a functional ability to adequately perform relevant activities, possession of sufficient knowledge and skills, maintenance of adequate performance levels, and appropriate professional attitudes. A registered nurse acting as a mentor needs sufficient expertise in terms of job-related knowledge, skills, and attitudes (Mikkonen et al., 2018). Mentors and students believe that the most important roles of a mentor are as protector, evaluator, educator and facilitator (Tagwa et al., 2016). A mentor also needs competence in supporting students' learning processes with goal-orientation, reflection during mentoring, constructive feedback and continuous student-centered evaluation (Bos et al., 2015; Hilli et al., 2014a; Jokelainen et al.,

2013a; McSharry et al., 2017). In addition, a mentor needs competence in creating a communication-promoting atmosphere, personal characteristics including empathy, patience, respectfulness, and strong motivation to mentor nursing students (Hilli et al., 2014a; Jokelainen et al., 2013b; Lapena-Monux et al., 2016). Mentors are expected to organize opportunities for students to learn and develop competence, and build confidence (Ford et al., 2016). It is also important for healthcare organization to build a clear and supportive mentoring structure, so that mentors have clear understanding of mentoring practices in their workplace.

Moreover, students recently surveyed by Pitkänen et al. (2018) believed that aspects of the mentoring relationship including frequent unscheduled discussions with their mentors and planning their learning outcomes enhanced their learning. In addition, a systematic review by Immonen et al. (2019) found evidence of a direct connection between clear mentoring practice in a healthcare organization and guidance of students' learning processes (including goal-orientation, reflection, constructive feedback and student-centred evaluation). These findings suggest that, by promoting a positive circle of mentors' competences, it is possible to enhance a student-centered evaluation as a main outcome to improve students' clinical learning experiences. Looking backward, the evaluation process is a main driver of learning: by defining evaluation priorities, it is possible to set the learning goals, the mentor-student's expectations, and mentors' competences required to achieving an effective students' clinical learning (Nielsen et al., 2016).

The apparent complexity of mentor competences, and variations in them, clearly indicate a need for an evidence-based model to gauge current and required competences of nursing students' mentors. Such a model could assist efforts to formulate effective mentoring strategies, build collaborative structures between stakeholders, and establish consistent mentor education programs across the EU. In this study we define the mentor as the nurse in the clinical practice who guides students' clinical learning in a real organizational healthcare setting.

Methods

Aim and hypotheses

The aim of this study was to meet the need identified above by developing and testing an evidence-based model of mentoring nursing students during clinical practice.

In addition, the model was applied to test the following hypotheses (see also Figure 1):

- H1. Mentors' personal characteristics are positively related to their motivation (H1a) and reflection during mentoring (H1b);
- H2. Mentors' motivation is positively related to mentoring practices in the workplace (H2a) and reflection during mentoring (H2b);
- H3. Mentoring practices in the workplace are positively related to goal-orientation;
- H4. Reflection during mentoring is positively related to constructive feedback;
- H5. Constructive feedback is positively related to goal-orientation;
- H6. Goal-orientation is positively related to student-centered evaluation.

Design

This study had a cross-sectional design, involving a coordinated international survey in five European countries: Finland, Italy Lithuania, Slovenia, and Spain.

Participants

Mentors were defined as the nurses in the clinical practice in charge of students' clinical learning and working in primary and specialist healthcare organizations. In total 4980 mentors in the five countries were invited to participate, and 1604 participated in the study (response rate 32 %), from 2016 to 2019, according to the authorization processes in each country and the time to develop a data collection network needed by each partner. Following checks of multivariate normality criteria for valid application of planned multivariate analyses, Exploratory and Confirmatory Factor Analyses (Tabachnick and Fidell, 2006), missing data (if the rate exceeded 5%) and multivariate outliers were deleted listwise (Graham, 2009; Tabachnick and Fidell, 2006). This led to the final sample consisting of 1360 participants: 533, 280, 280, 240, 222 and 85 working in Finland, Lithuania, Slovenia, Italy and Spain, respectively.

Data collection

Data were collected using a survey questionnaire, electronically in Finland and Spain, and with paper versions in Lithuania, Slovenia and Italy. In total, 33 healthcare organizations participated. Participants meeting two inclusion criteria (registered nurses working in a primary and/or specialized healthcare organization, with experience in mentoring nursing students during clinical practice) were recruited via a contact person provided by each organization. The questionnaire included questions on background information and the Mentors' Competence Instrument (Tuomikoski et al., 2018a). In the countries where data were collected electronically, two mixed approaches were used to improve the response rate. In Finland, a personal invitation

e-mail was sent to each eligible participant to explain the study aims and data treatment, and provide an anonymized internet link to the questionnaire. In Spain, together with a personal e-mail invitation, a public link to the questionnaire was disseminated (through the nursing associations and social media), via a system that prevented duplicate participation using a cookie check system. The public survey was also protected by a Captcha system (Dillman et al., 2014). In the countries where a paper-based approach was applied, candidate participants received a personal invitation and an envelope to anonymously return the filled questionnaire. A research assistant supported the paper-based survey, and a standard way to disseminate the questionnaire (involving the healthcare organizations and wards) was agreed by the country partners to ensure a common data collection approach was applied. The mentors each received one invitation and two reminders, all sent within a timeframe of a few weeks (Dillman et al., 2014).

Instrument

The Mentors' Competence Instrument (MCI) originally consisted of 63 items inviting 4-point Likert-type responses (1=totally disagree, to 4=totally agree) designed to assess 10 factors (Tuomikoski et al., 2018a). The factors are: mentoring practices in the workplace, mentor characteristics, mentor's motivation, goal-oriented mentoring, reflection during mentoring, student-centered evaluation, constructive feedback, supporting the student's learning process, identifying the student's need for mentoring, and mentoring practices between student and mentor (covered by 6, 7, 5, 9, 6, 10, 4, 8, 4 and 4 items, respectively).

Content validity

The MCI was translated into the languages of native participants in each country by the national principal investigator and/or a panel of experts involved in clinical nursing education. Back-forward translation was then applied to ensure semantic equivalence and content validity among the linguistic versions. Item coherence with the educational and organizational setting in each country were also discussed locally and by the European research team. Each translated version was blindly back-translated into English, then the original English version and back-translated version were submitted to the coordinating center and the scale's authors to compare the outcome with the original MCI and endorse the translated version's content validity (Maneesriwongul and Dixon, 2004).

Psychometric testing

Following protocols applied in a previous validation study (Tuomikoski et al., 2018a), the acquired data were subjected to Exploratory Factor Analysis (EFA) with Promax rotation and

principal axis factoring. Oblique rotation was maintained due to correlation among the scale's factors (Pett et al., 2003). In addition, we checked that the data met the following criteria for valid EFA: a Kaiser-Meyer-Olkin (KMO) statistic >0.60 , indicating sample adequacy; a significance value of $p < 0.01$, indicating sufficient relatedness of variables, according to Bartlett's test of sphericity (Costello and Osborne, 2005); and item loadings exceeding 0.30 (DeVellis, 2011). In the previous study (Tuomikoski et al., 2018a), eight factors were found to have $<5\%$ variance and seven $<4\%$ variance. In order to identify constructs that explain more variance with fewer factors (Peterson, 2000), in this study we improved the EFA by stepwise removal of factors with low variance and relatively little consistency of theoretical association with nursing students' mentoring needs, according to international studies. Eventually an EFA model with seven factors remained following deletion of three factors and 16 associated items: supporting the student's learning process (8 items); identifying the student's level of competence (4 items); and mentoring practices between student and mentor (4 items). In addition to removing three factors, three cross-loading items were deleted to improve the EFA model's construct validity.

The improved version of the MCI was then tested by Confirmatory Factor Analysis (CFA) with Full Implementation Maximum Likelihood (FIML) estimation and four fit indexes (the Root Mean Square Error of Approximation, RMSEA; Standardized Root Mean Residual, SRMR; Comparative Fit Index, CFI; and Tucker-Lewis Index, TLI) were calculated. A model is generally considered to fit a dataset acceptably if RMSEA and SRMR are <0.08 , while CFI and TLI are >0.90 (Byrne, 2009; Kline, 2010). EFA and CFA were performed on the same sample, due to MCI was previously developed and tested with EFA in a previous study on a different sample. In this study EFA's main aim was to test the variance factors' pattern and items' loadings. Once detected the same pattern, CFA was performed to confirm the fit of the improved model, as a basis to test the SEM model and research hypotheses.

The final MCI version of 7 factors and 44 items (Table 1) was used in this study: mentoring practices in the workplace (6 items); mentor's characteristics (7 items); mentor's motivation (5 items); goal-oriented mentoring (7 items); reflection during mentoring (6 items); student-centered evaluation (9 items); and constructive feedback (4 items). Cronbach's alpha values for the factors ranged between 0.83 and 0.94, well within the ranges regarded as indicating good (0.70 to 0.90) or excellent (> 0.90) reliability (DeVellis, 2011; Sartori and Pasini, 2007). The

overall variance in EFA is 68%. CFA demonstrated satisfactory fit indexes: RMSEA=0.050, SRMR=0.038, CFI=0.933 and TLI=0.927.

Ethical considerations

Permission to conduct the study was requested and granted in each country according to relevant national and international ethical conduct guidelines and practices. Participants received a letter providing information about the study with the invitation to participate in it. Their voluntary participation was interpreted as informed consent to participate. In Lithuania each participant also signed a consent form. National and European law (GDPR, 2018) was strictly followed to maintain confidentiality during all data collection and analysis procedures. The data acquired in each country are stored and protected at the participating university in that country.

Data analyses

Before the EFA and CFA, characteristics of missing data and the distribution of the remaining dataset's approximation to normality were checked to ensure that requirements for the planned analyses were met (Tabachnick and Fidell, 2006). Little's Missing Completely at Random (MCAR) test yielded p and chi-square values of 0.093 and 2591.803, respectively, providing no indications that data were missing in a systematic fashion (Graham, 2009; Little, 1988). If missing data rates exceeded 5%, missing data were deleted listwise (Graham, 2009). To test multivariate normality, Mahalanobis distances and their p -values of chi-square statistics, with 63 degrees of freedom, were calculated to identify and delete multivariate outliers. Finally, Mardia's kurtosis index was found to be 3328.009, well within the threshold value of 4065 for multivariate normality (Lombardi and Pastore, 2012; Tabachnick and Fidell, 2006). The initial number of participants was 1604, after missing data deletion 1577 were screened for multivariate outliers, and after deleting outliers 1360 remained and were deemed eligible for inclusion in the modeling. Checks of outlying participants' characteristics before deletion showed that they had significantly lower factor scores than the included participants ($p < 0.01$) and had not mentored a student for at least a year before the data collection ($p < 0.01$). Accordingly, they were excluded because they had less frequent and recent experience of mentorship than the included participants.

Descriptive statistics were calculated to describe the sample and scores for each item and factor. The six hypotheses we postulated regarding mentoring of nursing students were tested by

constructing a Structural Equation Model (SEM) with Full Imputation Maximum Likelihood (FIML) estimation. Its fit to the data was assessed using the indexes reported in the psychometric testing section, and the Coefficient of Determination (CD) was calculated to estimate the model's overall capacity to explain the focal phenomenon (Kline, 2010), i.e., mentoring in nursing students' clinical practice. IBM SPSS (V25.0) (IBM, 2017) was used for all preliminary analyses, reliability analyses, calculation of descriptive statistics and EFA, but Stata (V12.0) (StataCorp., 2011) was used for CFA and SEM model tests.

Results

Participants

The mean age of the participants was 41.9 years (SD 11.00, median 43, min 22, max 66) and the 87.9% of the participants were female. The mean work experience was 19.0 years (SD 10.63, median 18, min 1, max 38). The 61.1% of the participants attended a specific education about mentoring and the 92.0% mentored the last student within 6 months of the data collection.

Evidence-based model of mentoring in clinical practice of nursing students

All the postulated hypotheses were confirmed and all parameters in the model were significant ($p < 0.01$) (Figure 2 and Table 2). In detail, high levels of mentor's characteristics (more specifically, personal characteristics such as empathy, flexibility, tolerance, patients, support-associated with this factor) foster mentor's motivation (0.71) and this leads to better mentoring practices in the workplace (0.61). Among the pedagogical competences, reflection during mentoring enhances constructive feedback between mentor and student (0.79) and this competence improves goal-orientation (0.65). The effective goal-orientation improves mentor's competence of student-centered evaluation (0.79). This model explains 91.6% of the variance (CD) and has satisfactory goodness of fit: RMSEA, 0.055; SRMR, 0.083; CFI, 0.914; and TLI, 0.909.

In this study, the Finnish participants were over-represented, accounting for 533 of the 1604 who contributed empirical data. To assess the possibility that this may have biased the model's parameters, the model was tested by excluding 283 randomly selected Finnish mentors, to balance the sample size among countries (leaving 1077 mentors, including 250 from Finland, in the set used for modeling). This caused very minor changes in the model's parameter pattern and fit indexes (Table 3) and it further confirmed the research hypotheses.

Discussion

Mentoring is a key element of students' clinical learning, and hence nursing education (Tuomikoski et al., 2018b). Thus, improving mentors' competences in clinical settings enhances nursing students' competences and their professional identity (Jokelainen et al., 2012). Moreover, mentoring is beneficial for healthcare organizations: through providing high quality mentoring to students, organizations increase their attractiveness and the healthcare professionals' competences to effectively induct newcomers post-graduation (Brewer et al., 2011; Tomietto et al., 2014).

Findings of this study may assist efforts to identify aspects to prioritize in mentors' training, including both mentors' individual characteristics and pedagogical competences. In more detail, they show the value of mentors being flexible, patient, supportive and fair with students, and having high motivation to improve their mentorship. These factors are rooted in individuals, but both educational strategies and organizational support can enhance them. For example, by creating an organizational climate of openness and collaboration, mentors can more easily involve students in the work-team and foster multidisciplinary learning opportunities. Previous research has also demonstrated a positive association between ward-team motivation (work-engagement) and students' clinical learning (Tomietto et al., 2016). In addition, providing mentors with opportunities for professional growth, education, autonomy and organizational support should clearly enhance students' clinical learning. This is highly important, as many authors have found that mentors often face problems due to unbalanced or excessive demands in mentoring students and delivering nursing care (Hilli et al., 2014; Jokelainen et al., 2013). The model confirms that strong motivation of mentors leads to better mentoring practices in workplaces, and organizational factors play major mediating roles.

The results show that both individual and workplace-related factors are related to pedagogical aspects of mentoring. In more detail, high levels of the mentioned mentors' characteristics and motivation enhance reflection during mentoring, and the quality of mentoring practices in the workplace is positively associated with goal-orientation. Reflection on learning experiences and building meaningful learning from everyday practice are promoted when mentors are motivated, fair, flexible and supportive (Zanchetta et al., 2017). Furthermore, a supportive workplace increases learning opportunities, and students' goal-orientation benefits from openness and collaboration in the team (Bahrami et al., 2016).

Reflection and goal-orientation are pedagogically connected by the competence to provide constructive feedback: reflection leads to better feedback, and sharing constructive feedback improves mentors' and students' ability to set appropriate learning goals. This provides pedagogical coherence in supporting the learning process and taking into account the students' needs according to the learning opportunities in the clinical setting (Gong et al., 2017; VandeWalle et al., 2001). All the mentors' competences are connected and collectively promote student-centered learning that enables both evaluation of individual students' achievements and useful feedback for further improvement of their clinical learning (Mikkonen et al., 2018).

Previous studies have highlighted the importance of effective student-mentor relationships in a CLE (Mikkonen et al., 2017; Saarikoski et al., 2008; Tomietto et al., 2012; Vizcaya et al., 2015). However, we believe that our study addresses a need for a comprehensive model that clearly identifies key factors in the relationships (Oikarainen et al., 2018; Saarikoski and Strandell-Laine, 2018), and thus may facilitate the formulation of robust mentoring strategies.

Limitations and Strengths

After sensitivity analysis, by randomizing the Finnish participants and balancing the overall sample, the research hypotheses were confirmed. This analysis excluded the possibility of a country-bias in mentors' competences and it strengthened the generalizability of our results. After that, the model was tested with the main sample to enhance statistical power and capacity to infer relationships. The sample includes mentors working in locations well distributed across five European countries, but the model requires further tests in other countries, especially outside the EU, with different clinical learning structures. The data collection covered a 3 years period due to organizational reasons; over this period nursing education was stable in each participating country, anyway the clinical settings could have changed according to the changes occurred in the healthcare systems across Europe. In this vein, also mentors' education and competences could be affected by these changes over time.

Conclusions

This study confirms that mentors play crucial roles in nursing students' clinical learning, and it identifies the key competences which could design a shared view of mentoring in nursing education in the European healthcare settings. Thus, results of this international study may assist efforts to develop a common mentoring approach in clinical learning, nursing education and

healthcare organizations (which is essential in a globalized nursing education and labor market). Mentors' individual characteristics including flexibility, patience, supportiveness, fairness and motivation promote effective mentorship in the workplace and enhance their pedagogical competences. Educational institutions and healthcare organization can employ the evidence-based model while improving their existing mentorship practices. The evidence-based model may help decision-makers to identify aspects to prioritize in mentors' education in Europe. We further suggest that educational interventions need to be designed to enhance mentors' competences and tested in diverse educational and organizational settings across the European countries.

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Figure 1. Research model and hypotheses.

Figure 2. Estimation of SEM's parameters.

* statistical significance <0.001

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Table 1. Mentor Competence Instrument (MCI) and descriptive statistics (n=1360)

Factor (α , Eigenvalue, Variance, %)	Item	mean (\pm SD)	median	min	max	skewness	kurtosis	Cronbach alpha if item deleted	Item to total correlation
MENTORING PRACTICES IN WORKPLACE ($\alpha=0.88$) (Eigenvalue=2.067) (Variance=4.806%)	I am well-acquainted with the quality requirements and criteria relating to clinical practice and learning at work in social and health care.	3.16 (± 0.71)	3	1	4	-0.65	0.52	0.86	0.65
	I am well-acquainted with the mentoring process of students in clinical practice within my organization.	3.31 (± 0.71)	3	1	4	-0.85	0.65	0.84	0.73
	I am aware of generally agreed practices for student mentoring within my organization.	3.39 (± 0.70)	3	1	4	-0.97	0.66	0.83	0.77
	I follow generally agreed practices during student mentoring.	3.46 (± 0.68)	4	1	4	-1.17	1.40	0.84	0.73
	I am familiar with the tasks and responsibilities of the person in charge of mentoring students.	3.30 (± 0.75)	3	1	4	-0.84	0.17	0.86	0.65
	I am familiar with the tasks and responsibilities of the mentor.	3.50 (± 0.66)	4	1	4	-1.07	0.83	0.88	0.59
MENTOR CHARACTERISTICS ($\alpha=0.91$) (Eigenvalue=2.523) (Variance=5.866%)	It is easy for students to approach me.	3.61 (± 0.56)	3	1	4	-1.23	1.68	0.89	0.70
	I am empathetic towards students during mentoring.	3.59 (± 0.57)	3	1	4	-1.23	1.66	0.88	0.77
	I am flexible during the mentoring of students.	3.53 (± 0.59)	3	1	4	-1.03	1.21	0.89	0.69
	I am patient during the mentoring of students.	3.56 (± 0.58)	3	1	4	-1.13	1.31	0.89	0.73
	I am supportive of students.	3.63 (± 0.57)	3	1	4	-1.64	3.54	0.89	0.71
	I value the student as a member of the health care team.	3.64 (± 0.56)	3	1	4	-1.46	2.39	0.89	0.72
MENTOR'S MOTIVATION ($\alpha=0.86$) (Eigenvalue=1.150) (Variance=2.674%)	As a mentor, I am fair to all students.	3.70 (± 0.53)	3	1	4	-1.83	4.06	0.89	0.70
	Positive experiences in mentoring students increase my confidence regarding my ability to work as a mentor.	3.57 (± 0.59)	3	1	4	-1.18	1.40	0.83	0.70
	Encouragement from colleagues regarding the mentoring of students increases	3.24 (± 0.75)	3	1	4	-0.71	0.03	0.84	0.64

GOAL-ORIENTATED MENTORING ($\alpha=0.91$) (Eigenvalue=1.556) (Variance=3.619)	my enthusiasm to mentor students.								
	Constructive feedback regarding my mentoring of students increases my motivation to mentor students.	3.48 (± 0.66)	3	1	4	-1.14	1.10	0.82	0.73
	I want to learn and develop as a mentor.	3.58 (± 0.62)	3	1	4	-1.47	2.06	0.83	0.69
	I am interested in mentoring students.	3.40 (± 0.63)	3	1	4	-1.09	0.73	0.84	0.65
	5.1. I guide students in setting the goals that they want to achieve during the clinical practice.	3.52 (± 0.63)	3	1	4	-1.15	1.04	0.89	0.71
	I find out if the student's learning goals are concrete enough so that in practical situations the student knows what his or her goals are and how to attain them.	3.37 (± 0.66)	3	1	4	-0.71	0.02	0.89	0.74
	I find out whether or not the student's learning goals correspond with the learning opportunities provided at the place where the clinical practice is completed.	3.46 (± 0.64)	3	1	4	-0.92	0.46	0.88	0.76
	I clarify to the student what is expected of him or her in order to reach the set goals.	3.46 (± 0.63)	3	1	4	-0.90	0.37	0.89	0.75
	I provide feedback to the student on the goals that he/she has set.	3.56 (± 0.60)	3	1	4	-1.20	1.15	0.88	0.78
	I encourage the student to follow the fulfillment of his or her goals independently.	3.53 (± 0.66)	3	1	4	-1.08	0.74	0.89	0.70
	During the reflection time, I aim to encourage reciprocal feedback with the student.	3.62 (± 0.57)	3	1	4	-1.40	1.94	0.93	0.76
	I try to create a safe atmosphere during the reflection time.	3.70 (± 0.53)	3	1	4	-1.79	3.45	0.92	0.84
REFLECTION DURING MENTORING ($\alpha=0.93$) (Eigenvalue=1.646) (Variance=3.828%)	I encourage the student to share his or her experiences.	3.70 (± 0.54)	3	1	4	-1.82	3.44	0.92	0.83
	I relate empathetically to the student's experiences.	3.63 (± 0.56)	3	1	4	-1.40	1.91	0.92	0.79
	I am aware that the student's experiences are unique and significant for his/her	3.69 (± 0.53)	3	1	4	-1.73	3.28	0.92	0.80

	learning.								
	I believe that discussion on the student's experiences improves his/her learning.	3.69 (±0.54)	3	1	4	-1.71	3.25	0.92	0.79
STUDENT-CENTERED EVALUATION ($\alpha=0.94$) (Eigenvalue=19.203) (Variance=44.659%)	I encourage the student to remember his/her experiences as they happened and to evaluate them.	3.38 (±0.66)	3	1	4	-0.78	0.32	0.93	0.75
	During the evaluation, I guide the student in dealing with possible negative feelings.	3.28 (±0.71)	3	1	4	-0.65	-0.12	0.93	0.78
	I ask the student to critically and holistically reflect upon why things happened the way they did.	3.34 (±0.65)	3	1	4	-0.62	0.02	0.93	0.79
	I encourage the student to evaluate the situation from many perspectives / to find alternative explanations for events.	3.31 (±0.67)	3	1	4	-0.60	-0.08	0.93	0.80
	I emphasize that the evaluation of one's own learning can bring forth new thoughts, feelings and performances that the student may not have previously been aware of.	3.29 (±0.72)	3	1	4	-0.66	-0.18	0.93	0.76
	I guide the student to question what is regarded as self-evident.	3.43 (±0.72)	3	1	4	-0.89	0.24	0.93	0.70
	I support the student in evaluating his or her own activities.	3.50 (±0.61)	3	1	4	-0.94	0.53	0.93	0.73
	I encourage students to actively deal with their experiences during the entire clinical practice.	3.48 (±0.64)	3	1	4	-0.99	0.44	0.93	0.80
	I reflect upon which activities could be developed and how together with the student.	3.38 (±0.67)	3	1	4	-0.75	-0.01	0.93	0.75

CONSTRUCTIVE FEEDBACK $(\alpha=0.83)$ (Eigenvalue=1.099) (Variance=2.555%)	At the end of the clinical practice, I give a positive final evaluation of the student's performance.	3.43 (± 0.67)	3	1	4	-0.94	0.44	0.84	0.52
	I provide feedback immediately following a certain activity.	3.49 (± 0.62)	3	1	4	-0.93	0.41	0.76	0.68
	I provide feedback for the future and development of the student.	3.60 (± 0.57)	3	1	4	-1.26	1.43	0.74	0.73
	I provide feedback so that the student can change their practices.	3.47 (± 0.63)	3	1	4	-0.91	0.45	0.76	0.67

Table 2. Model's parameters estimation and statistical tests (n=1360)

Outcome variable	Explanatory variable	Parameter	Standard Error	z-test	p-value
Mentors' motivation	Mentors' characteristics	0.71	0.02	40.50	<0.001
Reflection during mentoring	Mentors' motivation	0.32	0.03	10.41	<0.001
	Mentors' characteristics	0.54	0.03	18.62	<0.001
Mentoring practices in the workplace	Mentors' motivation	0.61	0.02	29.57	<0.001
Goal-orientation	Mentoring practices in the workplace	0.30	0.02	11.76	<0.001
	Constructive feedback	0.65	0.02	29.15	<0.001
Constructive feedback	Reflection during mentoring	0.79	0.01	55.15	<0.001
Student-centered evaluation	Goal-orientation	0.79	0.01	63.74	<0.001
Chi-square	4338.485				
p-value	<0.01				
RMSEA	0.055				
SRMR	0.083				
CFI	0.914				
TLI	0.909				
CD	0.916				

Table 3. Model's parameters estimation and statistical tests with Finnish sample randomization (n=1077)

Outcome variable	Explanatory variable	Parameter	Standard Error	z-test	p-value
Mentor's motivation	Mentor characteristics	0.72	0.02	38.66	<0.01
Reflection during mentoring	Mentor's motivation	0.31	0.03	9.08	<0.01
	Mentor characteristics	0.56	0.03	17.05	<0.01
Mentoring practices in workplace	Mentor's motivation	0.62	0.02	26.95	<0.01
Goal-orientated mentoring	Mentoring practices in workplace	0.30	0.03	10.68	<0.01
	Constructive feedback	0.65	0.02	26.14	<0.01
Constructive feedback	Reflection during mentoring	0.79	0.01	51.95	<0.01
Student-centered evaluation	Goal-orientated mentoring	0.83	0.01	71.11	<0.01
Chi-square	3667.824				
p-value	<0.01				
RMSEA	0.055				
SRMR	0.084				
CFI	0.916				
TLI	0.911				
CD	0.920				

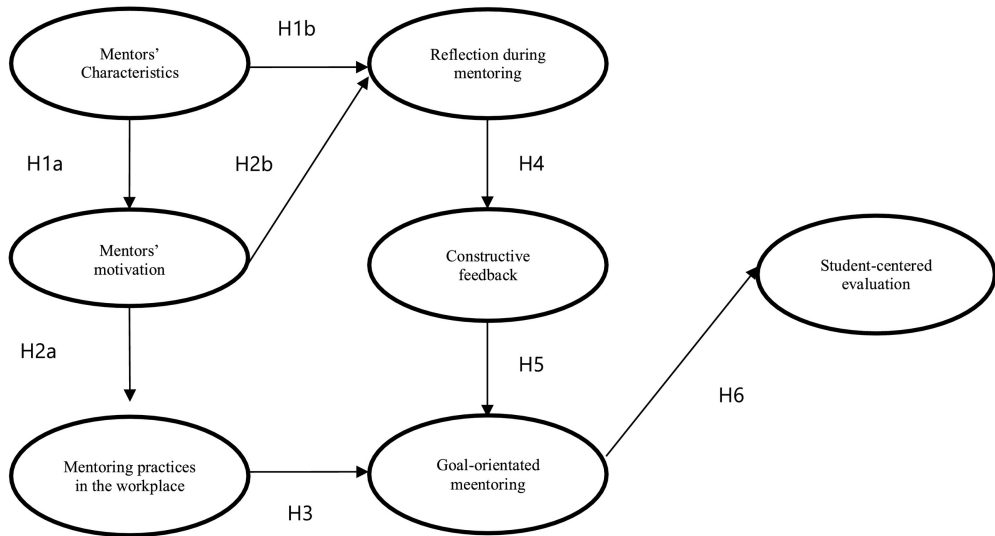


Figure 1

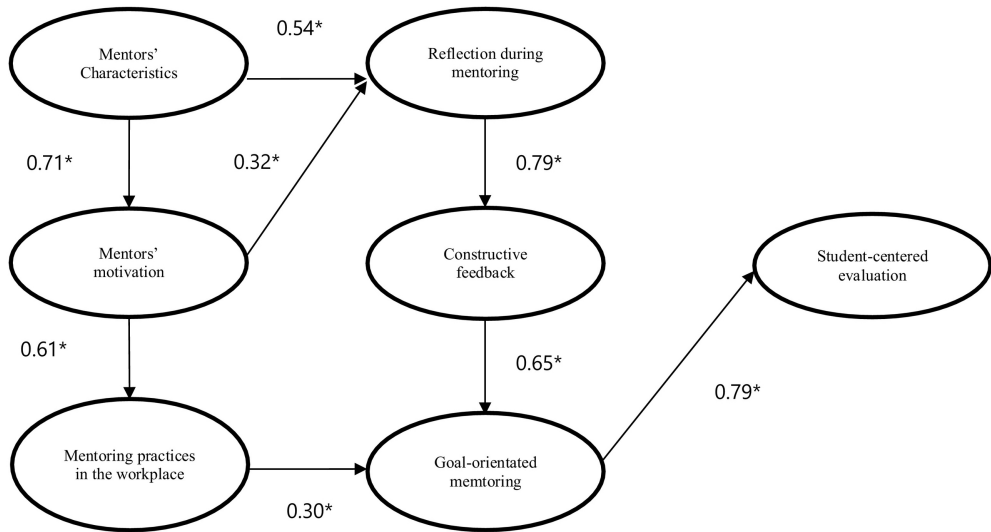


Figure 2